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OPERATION AND MAINTENANCE MANUAL

WIND SPEED AND WIND DIRECTION TRANSLATORS, MODEL 1567B AND 1567B-1

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TELEDYNE GEOTECH

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OPERATION AND MAINTENANCE MANUAL
WIND SPEED AND WIND DIRECTION TRANSLATORS, MODEL 1567B AND 1567B-1

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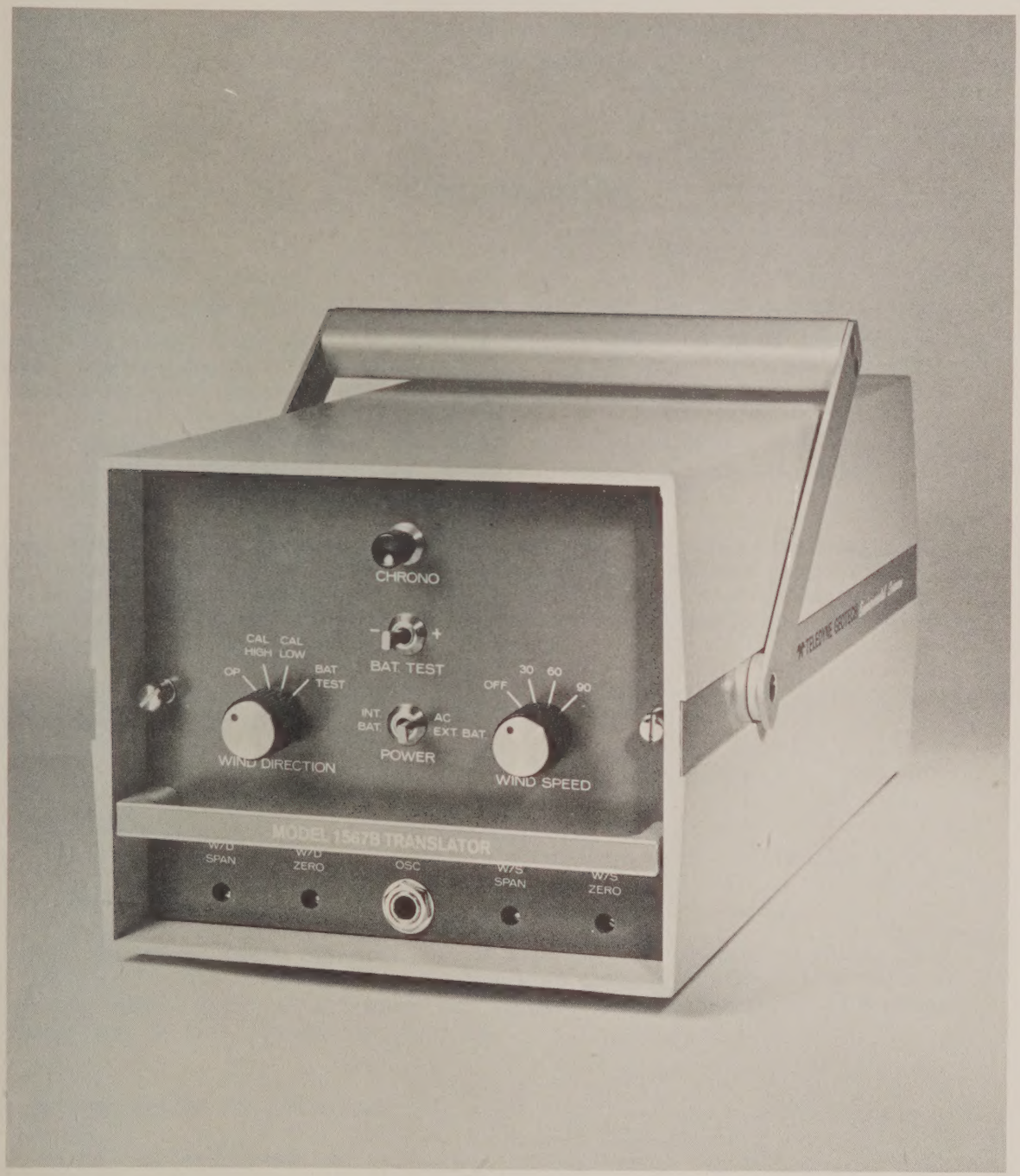
CHRONO
BAT. TEST
CAL HIGH
CAL LOW
OP.
BAT. TEST
WIND DIRECTION
INT. BAT.
AC
EXT. BAT.
POWER
OFF
30
60
90
WIND SPEED
MODEL 1567B TRANSLATOR
W/D SPAN
W/D ZERO
OSC
W/S SPAN
W/S ZERO

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OPERATION AND MAINTENANCE MANUAL
WIND SPEED AND WIND DIRECTION TRANSLATORS, MODEL 1567B AND 1567B-1

1. GENERAL DESCRIPTION

1.1 GENERAL

The 1567B and 1567B-1 Wind Speed and Direction Translators are all solid-state units designed to operate with Geotech Model 1564B wind speed transmitters and Model 1565B wind direction transmitters. The units may also be used with the older 1564 speed transmitters and 1565 direction transmitters.

The translator may be powered from 115 Vac, 50/60 Hz power (220 Vac, 50/60 Hz by minor wiring modification), internal batteries supplied by the customer or from an external dc source.

Both models of the translator contain identical wind speed circuitry. The 1567B incorporates a standard 0-360° wind direction circuit. The 1567B-1 features Geotech's proprietary 0-540° all electronic extended range wind direction circuit for applications where the usual 0/360° discontinuity and ambiguity cannot be tolerated.

Both models provide 0-1 mA output currents for application to Geotech Series 80 recorders or other similar output devices.

2. INSTALLATION

2.1 UNPACKING

Carefully unpack the translator and ac line cable. Inspect carefully for evidence of transit damage. In case of such damage, notify delivering carrier immediately. Translators are shipped without batteries to preclude damage due to cell leakage or swelling.

2.2 PREPARATION FOR OPERATION

a. AC Line Operation

Be certain that the front panel WIND SPEED rotary switch is in the OFF position. Place the POWER toggle switch in the AC/EXT. BAT. position and connect the ac line cable supplied with the translator to the rear panel connector labeled AC power.

NOTE

Unless the translator unit specifically bears a tag indicating otherwise, the unit is wired for 115 Vac, 50/60 hertz operation. Refer to Appendix A if field conversion to 220 Vac, 50/60 hertz is necessary.

b. Battery Operation

The AC line cable is not required for operation on internal batteries. Batteries must be installed in the translator by the user. Each translator requires five dry-cell batteries. Any of the following commonly available batteries may be used:

Eveready	509, 2745N
Burgess	F4H
RayOVac	941
Sears	4667
Wards	5MW (Catalog No. 13256)
Western Auto	7D8908
Bright Star	460
RCA	VS040C
Mallory	M908, M916
Zenith	Z916
Marathon	490
U.S. Military	BA200U
NEDA Types	908, 908C, 924

Before installing batteries, be certain that the front panel rotary switch labeled WIND SPEED is in the OFF position. Place the POWER toggle switch in the INT. BAT. position. To install the batteries, loosen completely the two knurled screws retaining the front panel of the translator to the case. Using the front panel handle, withdraw the front panel, with internal translator elements attached, from the case. Remove the four screws holding the battery retaining circuit board to the top of the translator. These four screws are adjacent to the Δ marks on the board. Slip out the board being careful not to strain the wiring attached to the board.

Insert five batteries vertically with terminals at top. Terminals may be oriented in any manner. The front four batteries supply positive power. The rear battery provides negative bias power.

Reinstall battery retainer circuit board and slide translator back into case. Tighten front panel retaining screws.

CAUTION

Never leave batteries in translator when translator is not being used. Always replace or remove dead batteries immediately.

c. External DC Power Application

External dc power is brought into the unit through the rear panel connector labeled EXTERNAL BATTERY.

The mate for this connector is Amphenol MS3106A-14S-6S.

The external dc power source must be capable of providing positive 12 Vdc +10%, -20% and negative 12 Vdc +10%, -20%. Internal regulators provide +12 V and -6 V to the circuits.

Power connection is made as shown in figure 1. Before connecting external power, be certain that the front panel rotary switch labeled WINDSPEED is in the OFF position.

Place the POWER toggle switch in the AC/EXT. BAT. position.

2.3 CONNECTING THE INSTRUMENTS AND RECORDERS

All connectors are clearly labeled on the rear of the translator. The standard cables supplied with Geotech transmitters and recorders mate directly with these connectors.

For applications where user furnished cables are to be utilized, the following connectors must appear on the translator end of the cable:

Wind Speed Transmitter Cable:	Amphenol MS3106A-14S-5P
Wind Direction Cable:	Amphenol MS3106A-14S-7P
Wind Speed Output Cable:	Amphenol MS3106A-14S-2P
Wind Direction Output Cable:	Amphenol MS3106A-14S-2P

Prior to connecting the cables, be certain that the front panel rotary switch labeled WIND SPEED is in the OFF position.

A wiring diagram (figure 3) showing input and output connection and translator case internal wiring is provided in the rear of this manual.

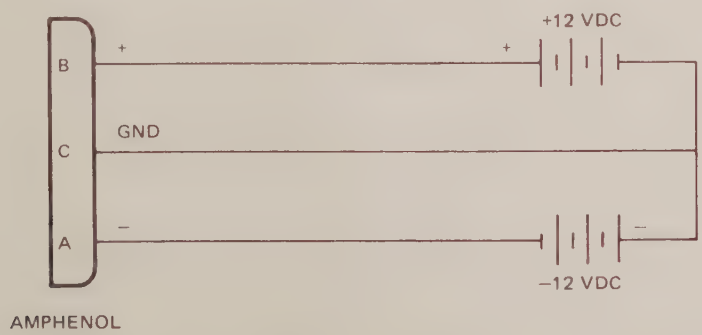

Figure 1. Power connection

3. OPERATION

3.1 OPERATING CONTROLS

The translator has five front panel operating controls. Each of these, and their functions are defined below.

WIND SPEED (rotary switch)

OFF	Translator power off
30	Translator power "on" and speed range is 30 mph (knots on knots version)
60	Translator power "on" and speed range is 60 mph (knots on knots version)
90	Translator power "on" and speed range is 90 mph (knots on knots version)

WIND DIRECTION (rotary switch)

OP	Wind direction circuits in normal operating mode
CAL HIGH	Direction test position, refer to paragraph 3.2.1
CAL LOW	Direction test position, refer to paragraph 3.2.1
BAT TEST	Energizes battery check circuits, refer to paragraph 3.3

POWER (toggle switch)

INT. BAT.	Disconnects external battery inputs and ac power supply inputs and connects translator to internal batteries
AC/EXT. BAT.	Disconnects internal batteries and connects ac power supply and external battery inputs to translator

BAT. TEST (spring loaded toggle switch)

+	Checks positive batteries, refer to paragraph 3.3
-	Checks negative batteries, refer to paragraph 3.3

CHRONO (momentary pushbutton)

Depressing provides a signal to output connectors for energizing event pens in Geotech Series 80 recorders.

3.2 NORMAL OPERATION

3.2.1 Wind Speed Section

The wind speed section of the translator accepts a variable frequency input from the 1564 or 1564B transmitter. This input is standardized in the translator to equal area pulses - one pulse for each cycle of input. These precision equal area pulses are applied to an amplifier whose gain is changed as a function of the range (30/60/90) selected on the front panel. A slight dc offset equivalent to transmitter threshold is then added to base line of the pulse train.

The resultant output of the wind speed section of the translator is then a train of precision pulses riding on a slight dc offset level. When the transmitter is not turning (zero wind), the output is therefore only the dc offset level.

When the transmitter commences rotation, pulses appear. At full scale (30, 60, or 90), the dc average value of the offset and pulses is 1 mA. At half scale, the dc avearage value is 0.5 mA, etc.

When this output is applied to a Series 80 recorder, the inductance and resistance of the galvanometer coil plus the inherent mechanical response characteristics of the recorder perform the dc averaging of the translator output.

If the output device does not have the inherent capability of averaging the pulse train, it is normally necessary to add a simple RC filter to derive the required dc level. The filter time constant should be 1/2 to 1 second.

3.2.2 Wind Direction Section (360°, Model 1567B)

The wind direction circuit (figure 4) provides a reference voltage to the potentiometer of the 1565 or 1565B transmitter and accepts the varying signal from the wiper of this potentiometer. In the 1567B, 360° translator, this signal is merely buffered and converted to a dc current over a range of 0-1 mA corresponding to 0-360°.

3.2.3 Wind Direction Section (540°, Model 1567B-1)

The operation of the 540° direction circuit (figure 5) commences the same as that described in paragraph 3.2.2. Electronic switching circuits are added to extend the range from 360° to 540°.

The range is electronically extended as shown in figure 2 which is a chart paper representation of the output. In the example wind initially blowing from the direction A, veers towards zero. When zero (end of range) is reached (B), the output is automatically rescaled to 360° the equivalent azimuth (C). The wind may vary about 360° without rescaling as shown in region C. The wind again veers towards zero but before reaching zero, turns and moves in the opposite direction (D). The wind now varies over an area of 540° and the unit does not rescale as long as the zero or 540° point is not reached. This is shown in the area D to E. At point E, end of range on the highside is reached and an automatic rescaling from 540° to the equivalent azimuth of 180° occurs. As shown in region F the wind may vary about 180° without additional rescaling.

The output of the direction section is 0-1 mA dc corresponding to 0-540° of azimuth.

3.3 CALIBRATION ADJUSTMENTS

The translator incorporates front panel calibration adjustments for wind speed and wind direction. The wind direction circuits of the translator feature high and low calibrate networks controlled by the front panel WIND DIRECTION rotary switch. The speed circuits of the translator include a front panel jack for injection of calibration signals from a sine-wave oscillator. These adjustments are described below.

3.3.1 Wind Direction Adjustments

Two wind direction adjustments are provided for the translator - SPAN and ZERO. These controls are preadjusted to a nominal setting at the factory. They should be reset when the translator is initially placed in operation, whenever the direction transmitter is changed, or whenever the power source is changed (i.e., from ac line operation to internal batteries). The method of adjusting these controls is given below:

a. Wind Direction Zero Adjust

Before attempting to adjust the translator, make sure the output device is properly zeroed. For Geotech Series 80 recorders, disconnect the recorder cable and mechanically zero the recorder. Reconnect the cable. With the direction transmitter connected to the translator and the wind direction switch set to CAL LO, adjust the W/D ZERO control for a zero trace on the recorder.

NOTE

When mechanically zeroing or reading trace values from the recorder, recorder should be feeding paper and the case should be tapped lightly for maximum accuracy.

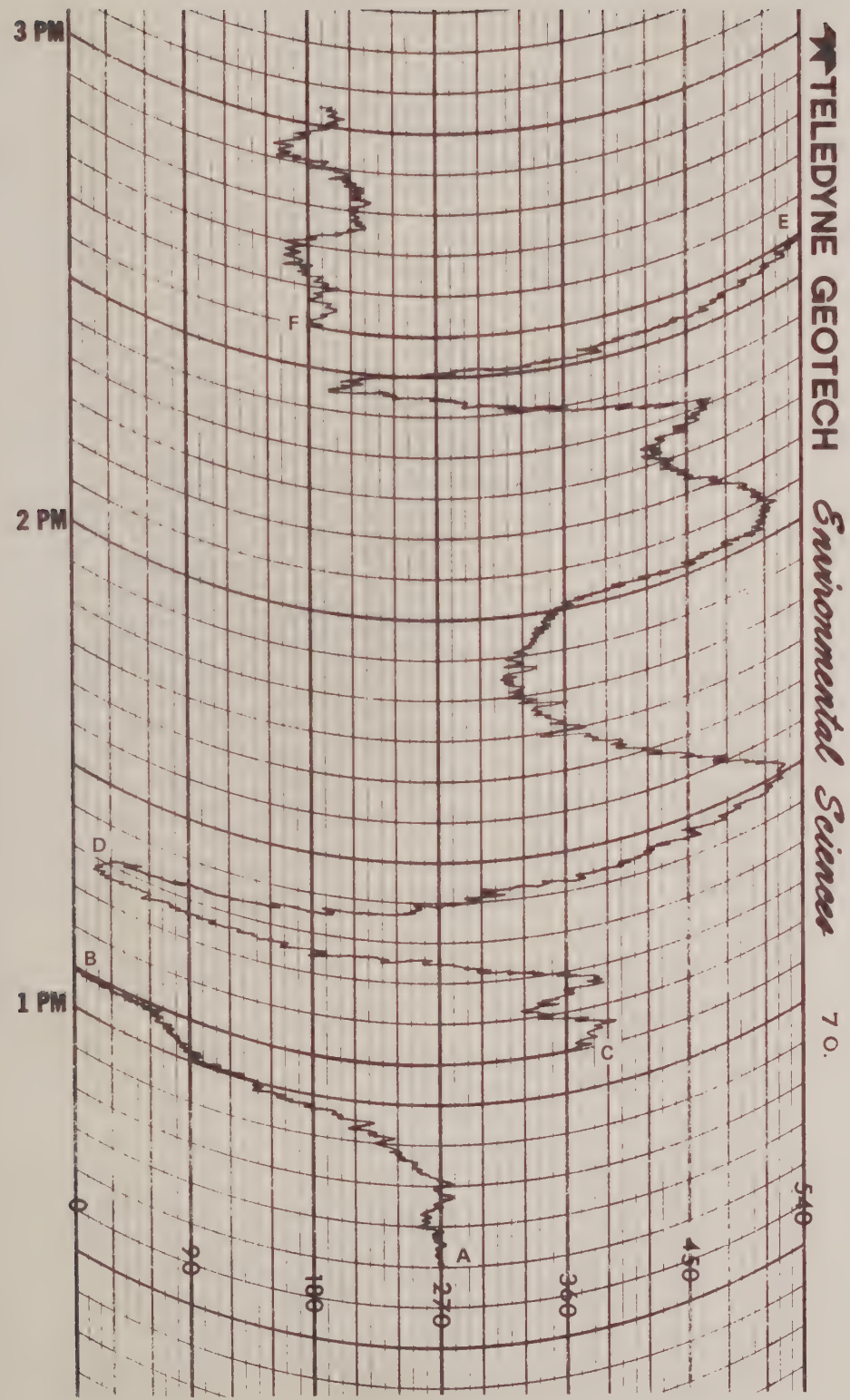

Figure 2. Reproduction of output record in 540° range

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b. Wind Direction Span Adjust

Be certain that recorder and direction zero points are correct as described above. With the direction transmitter connected to the translator, place the wind direction switch in the CAL HI position. Adjust the W/D SPAN control for full scale (1 mA dc) output. The CAL HI circuit is arranged such that should the direction transmitter potentiometer open, the CAL HI response will be noticeably above full scale. Should the potentiometer develop shorted turns, a noticeable downscale shift in the CAL HI response will be observed.

3.3.2 Wind Speed Adjustments

Two wind speed adjustments are provided for the translator - SPAN and ZERO. These controls are preadjusted at the factory for correct response. However, it is wise to occasionally check the settings and readjust the controls if necessary. It is recommended that the controls be rechecked whenever the unit power source is changed (i.e., from ac operation to internal battery operation). The method of readjusting the controls is given below:

a. WIND SPEED ZERO Adjust (threshold)

The WIND SPEED ZERO control on the front panel is set to provide an output current equivalent to the speed transmitter threshold. The most convenient method to do this in the field is to mechanically zero the output recorder with the recorder cable disconnected. Then reconnect the recorder cable and disconnect the speed transmitter input cable. Now, with the speed range switch set to 60, adjust the WIND SPEED ZERO control to provide a recorder trace of one-half of one minor division above zero on the chart paper. This setting provides an optimum threshold equivalent value.

When range changes are made, the threshold is automatically adjusted to the correct current value for each range. These values are shown below:

Range to be used	Trace setting
30	One minor division
60	1/2 of one minor division
90	1/3 of one minor division

NOTE

When setting mechanical recorder zero and translator threshold, recorder paper should be moving and the recorder case should be tapped lightly to achieve a true reading of maximum.

b. Wind Speed Span Adjust

To properly adjust Wind Speed Span, a calibration test signal must be injected into the front panel W/S CAL OSC jack. This jack will accept a tip plug or equivalent.

Inject a 347.2 hertz signal from a sine-wave oscillator at an amplitude of approximately 3 volts peak-to-peak. Set the range switch to 30 and adjust the span control to provide a 1 mA output (full scale on a Geotech Series 80 recorder). Switching the range to 60 and 90 should give a 1/2 and L/3 scale reading respectively.

NOTE

For versions of the translator scaled in knots, inject a test frequency of 400.9 Hz instead of 347.2 Hz.

3.4 BATTERY TEST

The translator features battery test circuits which enable rapid verification that the battery voltages are above acceptable minimum limits for proper translator operation. The test circuits, although expressly incorporated for battery test will also check ac power and external dc power as well as the internal batteries.

To perform Battery Test, place the WIND DIRECTION rotary switch in the BAT TEST position and the WIND SPEED rotary switch in any position except OFF. POWER switch should be in the correct position for the source used.

Move the BAT TEST spring loaded toggle switch to +. Wind direction output will read 1/2 scale (0.5 mA) or greater if positive power is adequate.

Move the BAT TEST toggle switch to -. Wind direction output will read less than 1/2 scale (0.5 mA) if negative power is adequate.

NOTE

Positive battery test must check as satisfactory before proceeding with negative battery test.

4. SPECIFICATIONS

4.1 ELECTRICAL

Inputs

Wind Speed Transmitter, 1564 or 1564B
Wind Direction Transmitter, 1565 or 1565B

Input Impedance

Speed	620 Ω
Direction	1.2 MΩ

Output

Speed	0-1 mA average dc into 0-6 kΩ
Linearity	±0.5% of F/S
Temp. Stability	±0.01%/°C of F/S
Direction	0-1 mA dc into 0-6 kΩ
Linearity	±0.5% of F/S
Temp. Stability	±0.01%/°C of F/S

Power Requirements

AC Line	117 or 230 Vac, 50/60 Hertz, 15 watts
External DC	+12 Vdc, ±10% at 100 mA, including transmitter power
	-12 Vdc, ±10% at 40 mA
Internal Batteries	5 Burgess F4H or equiv.

4.2 PHYSICAL

Length	12 inches
Height	5-1/2 inches
Width	7 inches
Weight	Approx 20 lbs with batteries installed

5. MAINTENANCE

5.1 PREVENTIVE MAINTENANCE

Routine preventive maintenance is not required. Occasionally, depending upon environment, circuit board contacts should be cleaned using a quality, commercially available contact cleaner. Accumulation of dust, grit, and other foreign material should be removed from the board.

5.2 CORRECTIVE ACTION

Other than replacement of the batteries, field servicing should be performed by experienced technicians only.

When servicing the translator, care must be exercised not to apply excessive soldering heat. Heat can cause component damage and/or cause etch to lift from the circuit board. Before assuming malfunction of the translator, be certain that the sensors and corresponding output monitoring devices are properly connected and the proper power is applied to the translator.

The translator may be returned to Teledyne Geotech for servicing in the absence of qualified field personnel.

5.3 TROUBLESHOOTING

Note

> Make certain that the front panel power selector switch is in the proper position for the type of power that is going to be used.

The following represents indications that the translator is malfunctioning and requires attention:

a. One or both outputs are negative;

b. One or more calibration steps can not be performed satisfactorily when the input signal(s) are known to be correct;

c. Output(s) in OP mode is steady when the wind is varying and the sensor(s) are known to be operating properly;

d. Any overheating, smoke or charring of the translator components;

e. Obvious nonlinearity of response.

When troubleshooting the translator it is first necessary to isolate the existing problem to a certain area of the circuitry. An understanding of the operation of the circuits are necessary for isolation. Subsequent paragraphs describe the operation of the translator. Using these descriptions and the schematic in this manual, a qualified technician should be capable of performing corrective actions. The three main areas of the translator are as follows:

5.3.1 Wind Speed Circuit

The wind speed circuit takes its input (a variable frequency) from pin 13 of the edgeboard connector and applies it to the input buffer amplifier, Z3 through an RC network. A small amount of positive offset is applied to Z3 to prevent low level noise from entering the amplifier and giving false output indications. Q2, Q3, Z4 and associated components, make up a very stable and drift free one-shot multivibrator that is, for all practical purposes, immune to power and temperature drift. The output of this multivibrator is controlled by R43 (W/S Span) and coupled through a switching circuit consisting of Q8, Q5, Q6 and associated components. The one-shot multivibrator (Q2, Q3, and Z4) controls the duration of the pulse signal and the switching circuit controls the height such that a dc average component directly proportional to the frequency is generated. The area of the pulse thus is constant. The pulse signal is now voltage-amplified by Z5 which has its gain controlled by the front panel range switch. A precise amount of offset (controlled by R44, W/S Zero) is applied at the input of Z5 to compensate for the wind speed sensor starting threshold. With no signal applied this offset can be measured at the output connector (J2) and should be 100 ±10 mV at 30 mph, 50 ±10 mV at 60 mph and 33.3 ±10 mV at 90 mph respectively, across a 5000 ohm 1/4 W ±0.1% load and utilizing a high input impedance voltmeter to prevent loading. The output of Z5 is coupled to a current driver (Z6) and from there to the output of the translator and to the recording device. The output is a train of precise pulses whose average dc value is proportional to wind speed. Equivalent average dc value is 0-1 mA full scale.

5.3.2 Wind Direction Circuit

The wind direction circuit can be either of two circuits depending on the type of translator being used. The Model 1567B uses the basic 0° - 360° circuit. The Model 1567B-1 adds a switching circuit to the basic circuit to extend the range to 0° - 540° (provisions for adding this circuit exists in all models of the Model 1567 translator). The basic circuit consists of an input buffer amplifier (Z1), a current output driver (Z2) and a voltage regulator (Q1) and associated components. The voltage regulator applies approximately 5 Vdc across a precision potentiometer in the sensor and an output is taken from the wiper and applied to the input of the buffer amplifier Z1. The output of Z1 is applied directly to the current driver Z2 and from there out to the recording device. Output is 0 - 1 mA full scale. In the extended range version (0° - 540°) the output of Z1 buffer amplifier is added to the voltage switched on or off through a FET (Q11). The FET is driven by transistor Q12 which in turn, is controlled by logic consisting of Z7, Z8, and Z11.

The adding action of the output of Z1 and the switched voltage through Q11 provides the range extension. The adder node point is the junction of R58 and R62. This node point is amplified through Z10 and Z9 to provide a voltage output to the current driver Z2.

When the voltage through Q11 is not added to the output of Z1, the circuit is operating in a straight 0 - 360° mode providing an output of 0 - 0.666 mA from the current driver Z2.

The voltage which is added is derived from regulator Z12, which also provides reference voltages to the logic circuit comparators Z7 and Z8.

As can be seen from the foregoing discussion, if switch Q11 is properly controlled by the logic, the following will occur:

With the sensor pointing to 0°, the output of Z1 will be 0 Vdc and the output of Z2 will be 0 mA. As the sensor is rotated toward 360°, the output of Z1 will increase and the output of Z2 will approach 0.666 mA. At the 360° transition point the output of Z1 will suddenly drop to zero (0°), the adder will turn on and the output of Z2 will remain at 0.666 mA (360°). As the sensor continues to rotate in the same direction, the output of Z1 will rise from 0 again; the Z2 output will continue to rise smoothly from 0.666 mA (360°) to 1 mA (540°).

At 180° past the transition the Z2 output will reach 1 mA or 540° at which point the adder will turn off dropping the Z2 output to 0.333 mA or 180°.

Thus, by controlling the adder, range is extended. By similar processes, downscale rotation can be explained - when the 0° point is hit at the sensor, the Z2 output is 0° (0 mA). As the transition from 0 to 360° is made, the Z1 output jumps to maximum (360°), the Z2 output jumps to 0.666 mA (360°). Reversing rotation and crossing the gap 360° to 0° now causes the Z1 output to drop from maximum to 0 but Z2 retains the 0.666 mA value (360°).

Thus, fluctuation about the switch point, while causing 0 to maximum jumping in the Z1 output, merely provides a linear variation around 0.666 mA (360°) in the Z2 output. Ambiguity is eliminated.

As can be inferred from the above discussion, two points are clear.

a. Range extension is controlled by adding or not adding the electrical equivalent of 360° to the basic translator output.

b. Removing ambiguity is possible in extended range operation only if the adder is controlled so that once switched, return switching occurs only when ends of the extended range are reached.

It is the function of the logic elements (logic elements of two comparators Z7 and Z8 and a series of gates, Z11 and associated diodes), to provide the necessary control. Comparators are referenced to the voltage regulator, Z12.

Comparator Z7 detects when the input signal from the Z1 buffer amplifier is upscale. Comparator Z8 detects when the input signal is downscale. In conjunction with the gates, the following decisions are made:

a. If the input was just upscale but now is downscale, and the adder is off, turn on the adder to extend the output range upward.

b. If the input was just downscale and is now upscale, and the adder is off, turn it off to allow the output to decrease linearly across the transition (e.g., 362° to 361°, to 360° to 359°, etc.)

c. If the input was just downscale and is now upscale, and the adder is off, turn it on to place the output around the 360° output point rather than the transitional 0° point.

These decisions are made by combining direct outputs of the comparators through lag outputs of the comparators using the gates of Z11. The lag is accomplished by simple capacitive effects of C21.

Storage of the decisions made occurs in Z11C and Z11D which act as a flip-flop.

Through the decisional mechanism described, the proper control for 0 - 540° operation is accomplished.

The translator automatically goes to the basic mode (0 - 360°) for Hi and Lo calibrate check.

5.3.3 Power Supply

The power supply is of common design with a full wave bridge rectifier, a positive regulator consisting of Q8, Q7 and associated components supplying +12 Vdc, a negative regulator consisting of Q10, Q9 and associated components supplying -6 Vdc. The external battery power, when used, is also controlled by the regulators. The internal batteries are not regulated to minimize the current drain during internal battery operation.

6. SPARE PARTS LISTS

6.1 GENERAL

The spare parts lists provided as a part of this manual are for customer convenience and guidance only. They should not be construed as a provisioning document nor do they imply a recommendation by Geotech that field repairs be attempted in the absence of qualified technical personnel and proper test equipment.

Spare Parts List

Item	Part no.	FSCNO	Description	Ref. des.
1	33600-01-01	99019	Wind Speed, Wind Direction Translator, Model 1567B	
	33600-01-02	99019	Wind Speed, Wind Direction Translator, Model 1567B-1	
2	150345	99019	. Handle, Arm	
3	34175	99019	. Handle	
4	34171-01-02	99019	. Printed Circuit Board	
	34171-01-01	99019	. Printed Circuit Board	
5	34413-01-01	99019	. Field Case Assembly	
6	MS3057-6A	Any	. Cable Clamp	
7	LF-JAX32A	82389	. Telephone Jack with Input Disconnect	
8	DS70-2BD-1	49956	. Knob	
9	34199-99-01	99019	. Transformer	
10	34181-01-01	99019	. Printed Circuit Board, Battery Pack Assembly	
11	51-14759-50-01	99019	. Cable	
12	F-7264		. Feet, Rubber	
13			. Fuse, 1/2A, 3AG, Slo-Blo	F1
14			. Fuse Holder	XF1
15	MS3106A-14S-7S	Any	. Connector, Socket	J1
16	MS3102A-14S-2S	Any	. Connector, Socket	J2, J6
17	MS3106A-14-6S	Any	. Connector, Socket	J3
18	MS3102A-14S-7S	Any	. Connector, Socket	J4
19	MS3102A-14S-5S	Any	. Connector, Socket	J5
20	2VH22/1AB8	05574	. Connector	J7
21	MS3102A-14S-7P	Any	. Connector, Plug	P1
22	MS3106A-14S-2P	Any	. Connector, Plug	P2, P6
23	MS3102A-14S-6P	Any	. Connector, Plug	P3
24	MS3106A-14S-7P	Any	. Connector, Plug	P4
25	MS3106A-14S-5P	Any	. Connector, Plug	P5
26	FH-223	31356	. Switch, DPDT, On-None-On	S1
27	X72041N	31356	. Switch, 2-Pole, 4 Position	S2
28	FH-127	31356	. Switch, SPDT, On (Momentary)-Off-On (Momentary)	S3
29	X54041N	31356	. Switch, 4-Pole, 4 Position	S4
30	MSP-1058	95146	. Switch, Momentary Push-Button	S5

Spare Parts List
WS/WD Translator, Model 1567B/1567B-1 PCB

Item	Part no.	FSCNO	Description	Ref. des.
1	34171-02-01	99019	Printed Circuit Board Fabrication	
2	DD-201	71590	. Capacitor, 200 pF, 1000 Vdc	C1
3	192P4729R8	56289	. Capacitor, 0.0047 µF, 80 Vdc	C2
4	192P1049R8	56289	. Capacitor, 0.1 µF, 80 Vdc	C11,C3, C18,C13
5	150D226X0015B2	05571	. Capacitor, 22 µF, 15 Vdc	C4,C12
6	B1A473JS	12406	. Capacitor, 0.047 µF	C6
7	DD-150	71590	. Capacitor, 15 pF, 1000 Vdc	C7
8	192P6839R8	56289	. Capacitor, 0.068 µF, 80 Vdc	C8
9	150D157X001552	56289	. Capacitor, 150 µF, 15 Vdc	C14,C16, C34
10	TE1166	56289	. Capacitor, 350 µF, 15 Vdc	C15,C17
11	150D396X9010B2	56289	. Capacitor, 39 µF, 10 Vdc (Version -01)	C19
			. Capacitor, 39 µF, 10 Vdc (Version -02)	C19,C21
12	DD-101	71590	. Capacitor, 100 pF, 1000 Vdc (Version -02)	C20
13	2N3906	04713	. Transistor (Version -01)	Q1
14	2N3906	04713	. Transistor (Version -02)	Q1,Q12
15	2N5485	04713	. Transistor	Q2
16	2N4979	16170	. Transistor	Q3,Q4,Q6
17	2N4979	16170	. Transistor (Version -02)	Q11
18	2N5088	04713	. Transitor	Q7
19	2N4918	04713	. Transitor	Q8
20	2N5087	04713	. Transistor	Q5,Q9
21	2N4921	04713	. Transistor	Q10
22	LVA43A	59875	. Diode, Zener, 4.3V, 5%	CR1
23	1N3064	Any	. Diode	CR2,CR3, CR4,CR5
	1N3064	Any	. Diode (Version -02)	CR13,CR14, CR16,CR17, CR18,CR19, CR20
24	1N825	Any	. Diode, Temperature Comp. Zener, 6.2V	CR6
25	SZ7.5	81071	. Diode, 1%	CR7

Spare Parts List, Continued

Item	Part no.	FSCNO	Description	Ref. des.
26	1N759A	Any	. Diode, Zener, 120V, 5%	CR8
27	1N2482	Any	. Diode	CR9,CR10, CR21
28	MDA920A-2	04713	. Diode	CR11
29	LVA68A	59875	. Diode, Zener, 6.8V, 5%	CR12
30	RC07GF226J	Any	. Resistor, 22M, 1/4W, 5%	R1
31	RC07GF152J	Any	. Resistor, 1.5K, 1/4W, 5%	R2
32	RN60D4991F	Any	. Resistor, 4.99K, 1%	R3,R8,R28, R27
33	RN60D9090F	Any	. Resistor, 909Ω, 1%	R5,R6,R29, R30
34	RC07GF333J	Any	. Resistor, 33K, 1/4W, 5%	R4
35	CG 1/4	01295	. Resistor, 30.1K, 1% Carbon Film Only	R7
36	RN60C1821F	Any	. Resistor, 18.2K, 1%, WW or Metal Film Only	R9
37	RN60C1001F	Any	. Resistor, 10K, WW, 1%, WW or Metal Film Only	R10
38	RC07GF621J	Any	. Resistor, 620Ω, 1/4W, 5%	R11
39	RC07GF512J	Any	. Resistor, 5.1K, 1/4W, 5%	R12,R14
40	RC07GF103J	Any	. Resistor, 10K, 1/4W, 5%	R13,R16,R38
41	RC07GF204J	Any	. Resistor, 200K, 1/4W, 5%	R15
42	RN60P4990F	Any	. Resistor, 499Ω, 1%	R17
43	RN60D5111F	Any	. Resistor, 5.11K, 1%	R18
44	RN60C3012F	Any	. Resistor, 30.1K, WW or Metal Film Only	R19
45	RC07GF203J	Any	. Resistor, 20K, 1/4W, 5%	R20
46	RC07GF513J	Any	. Resistor, 51K, 1/4W, 5%	R21
47	RC07GF473J	Any	. Resistor, 47K, 1/4W, 5%	R22
48	RC07GF104J	Any	. Resistor, 100K, 1/4W, 5%	R23
49	RC07GF4725	Any	. Resistor, 4.7K, 1/4W, 5%	R24
50	RN60D2493F	15584	. Resistor, 250K, 1%	R25
51	RN60D2670F	Any	. Resistor, 267Ω, 1%	R31
52	SM-7	15584	. Resistor, 38.45K, 0.1%, WW	R32
53	SM-7	15584	. Resistor, 52.45K, 0.1%, WW	R33
54	SM-7	15584	. Resistor, 75.76K, 0.1%, WW	R34
55	RC07GF102J	Any	. Resistor, 1K, 1/4W, 5%	R35
56	RC07GF100J	Any	. Resistor, 10Ω, 1/4W, 5%	R36

Spare Parts List, Continued

Item	Part no.	FSCNO	Description	Ref. des.
57	RC07GF511J	Any	. Resistor, 510Ω, 1/4W, 5%	R37
58	RC07GF200J	Any	. Resistor, 20Ω, 1/4W, 5%	R39
59	RN60D7500F	Any	. Resistor, 750Ω, 1%	R40
60	78PR10K	73138	. Potentiometer, 10K	R41,R43
61	78PR200	73138	. Potentiometer, 200Ω	R42
62	78PR50	73138	. Potentiometer, 50Ω	R44
63	RC07GF913J	Any	. Resistor, 9.1K, 1/4W, 5%	R82
64	RC07GF120J	Any	. Resistor, 12Ω, 1/4W, 5%	R72,R73
65	66WR500	73138	. Potentiometer, 500Ω (Version -02)	R45
66	RC07GF751J	Any	. Resistor, 750Ω, 1/4W, 5% (Version -02)	R46
67	RC07GF222J	Any	. Resistor, 2.2K, 1/4W, 5% (Version -02)	R71
68	RC07GF2R7J	Any	. Resistor, 2.7Ω, 1/4W, 5% (Version -02)	R47
69	RC07GF751J	Any	. Resistor, 750Ω, 1/4W, 5% (Version -02)	R48
70	RC07GF202J	Any	. Resistor, 2K, 1/4W, 5% (Version -02)	R49,R50, R51
71	RC07GF102J	Any	. Resistor, 1K, 1/4W, 5% (Version -02)	R52,R53
72	RC07GF242J	Any	. Resistor, 2.4K, 1/4W, 5%	R74
73	RC07GF242J	Any	. Resistor, 2.4K, 1/4W, 5% (Version -02)	R56,R57
74	RC07GF182J	Any	. Resistor, 1.5K, 1/4W, 5% (Version -02)	R54
75	RC07GF510J	Any	. Resistor, 51Ω, 1/4W, 5% (Version -02)	R55
76		15584	. Resistor, 10K, WW, 0.025% (Version -02)	R58
77	RC32GF511J	Any	. Resistor, 510Ω, 1W, 5% (Version -02)	R59
78	RC07GF331J	Any	. Resistor, 330Ω, 1/4W, 5% (Version -02)	R60
79	RC07GF101J	Any	. Resistor, 100Ω, 1/4W, 5%	R83,R84
80		15584	. Resistor, 9.970K, WW, 0.025% (Version -02)	R62
81	RC07GF472J	Any	. Resistor, 4.7K, 1/4W, 5%	R81,R85
82	RC07GF512J	Any	. Resistor, 5.1K, 1/4W, 5% (Version -02)	R63,R65, R70
83	RC07GF272J	Any	. Resistor, 2.7K, 1/4W, 5% (Version -02)	R64
84	RN60D2002F	Any	. Resistor, 20K, 1% (Version -02)	R66
85	RN60D7151F	Any	. Resistor, 7.15K, 1/4W, 1% (Version -02)	R67
86	RN60D1502F	Any	. Resistor, 15K, 1% (Version -02)	R68
87	RN60C4991F	Any	. Resistor, 4.99K, 1%, WW or Metal Film Only (Version -02)	R69

Spare Parts List, Continued

Item	Part no.	FSCNO	Description	Ref. des.
88	79PR10K	73138	. Potentiometer, 10K	R86,R87
89	1N751A	Any	. Diode, Zener, 5.1V, 5%, 100mW	VR1
90	801A/B/S	15818	. Operational Amplifier	Z1
91	U15B7741312	07263	. Operational Amplifier	Z2,Z6
92	U15B7741312	07263	. Operational Amplifier (Version -02)	Z7,Z8, Z9,Z10
93	LM301AH	27014	. Operational Amplifier	Z4
94	946	07263	. Integrated Circuit, Dep (Version -02)	Z11
95	215R7723312	07263	. Voltage Regulator, µA723 (Version -02)	Z12
96	U5B77403933	07263	. Operational Amplifier	Z5
97	U5B77413132	07263	. Operational Amplifier	Z3

Federal Supply Code List

01295	Texas Instruments, Incorporated, Components Group Dallas, Texas 75222
04713	Motorola, Incorporated, Semiconductor Products Division Phoenix, Arizona 85008
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15818	Teledyne Semiconductor Mountain View, California 94040
16170	Teledyne Systems Company Communications Division Los Angeles, California 90066
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49956	Raytheon Company Lexington, Massachusetts 02173
56289	Sprague Electric Company North Adams, Massachusetts 01247
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73138	Beckman Instruments, Incorporated, Helipot Division Fullerton, California 92634
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82389	Switchcraft, Incorporated Chicago, Illinois 60630
95146	Alco Electronics Products, Incorporated Lawrence, Massachusetts 01843
99019	Teledyne Geotech Garland, Texas 75041

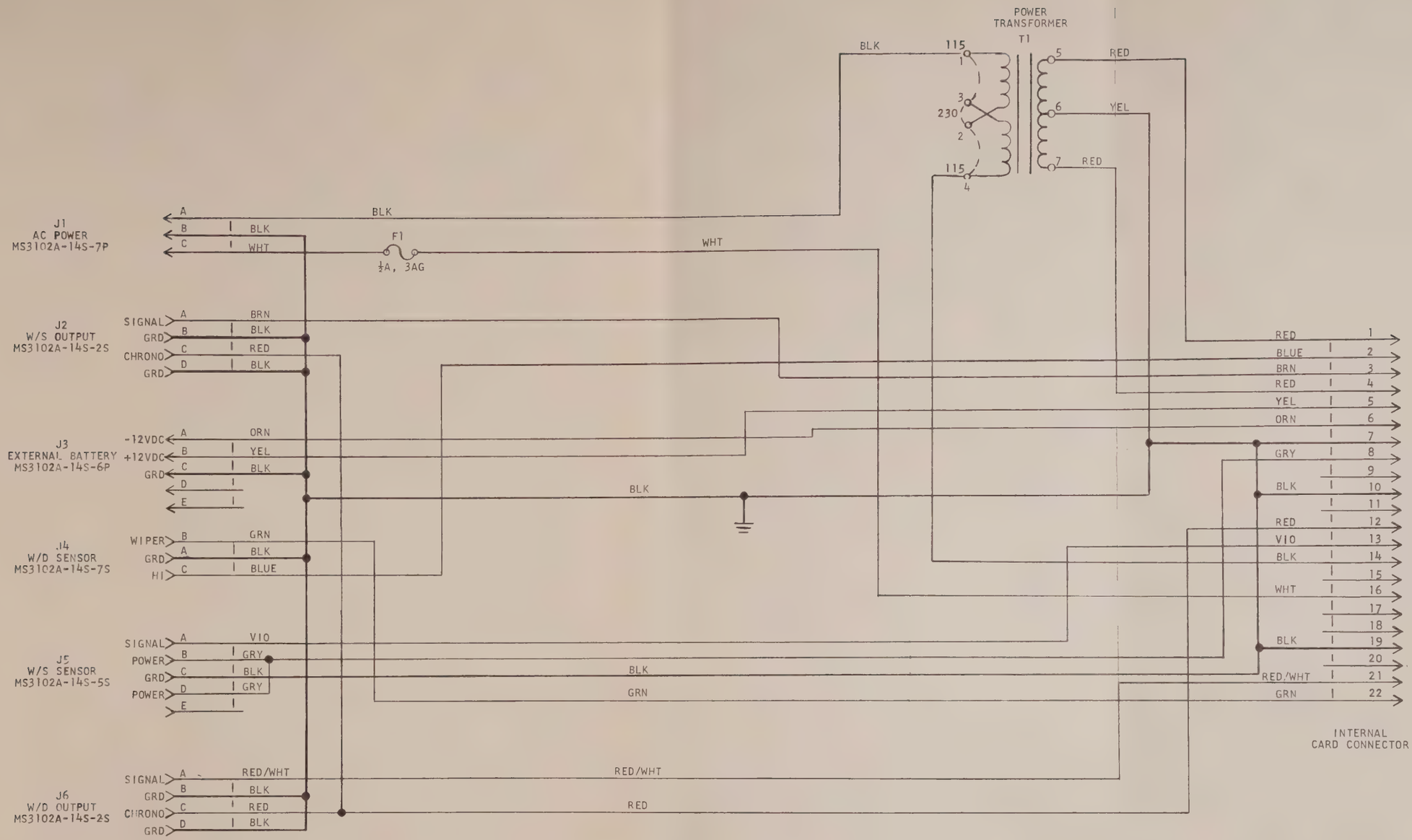
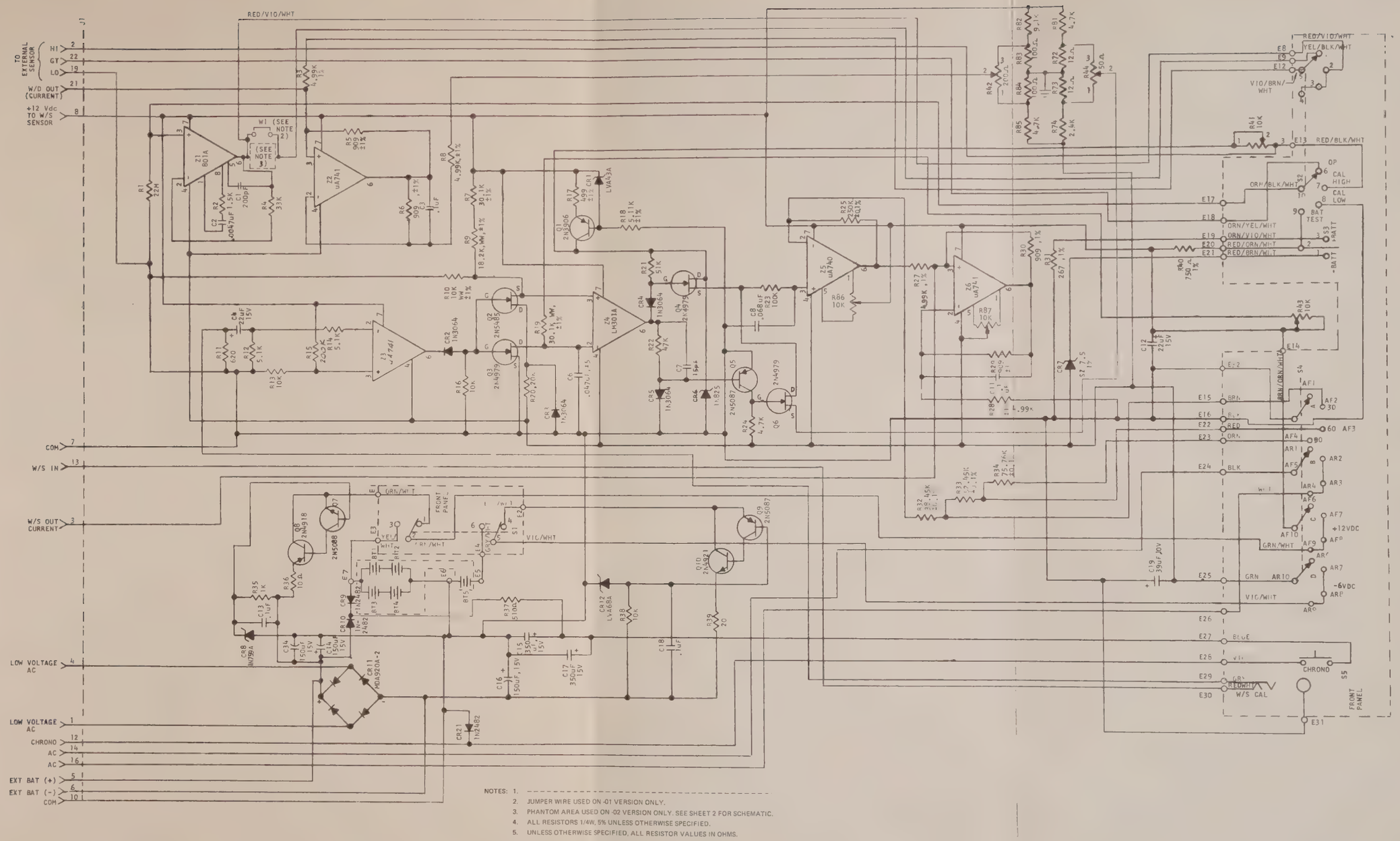
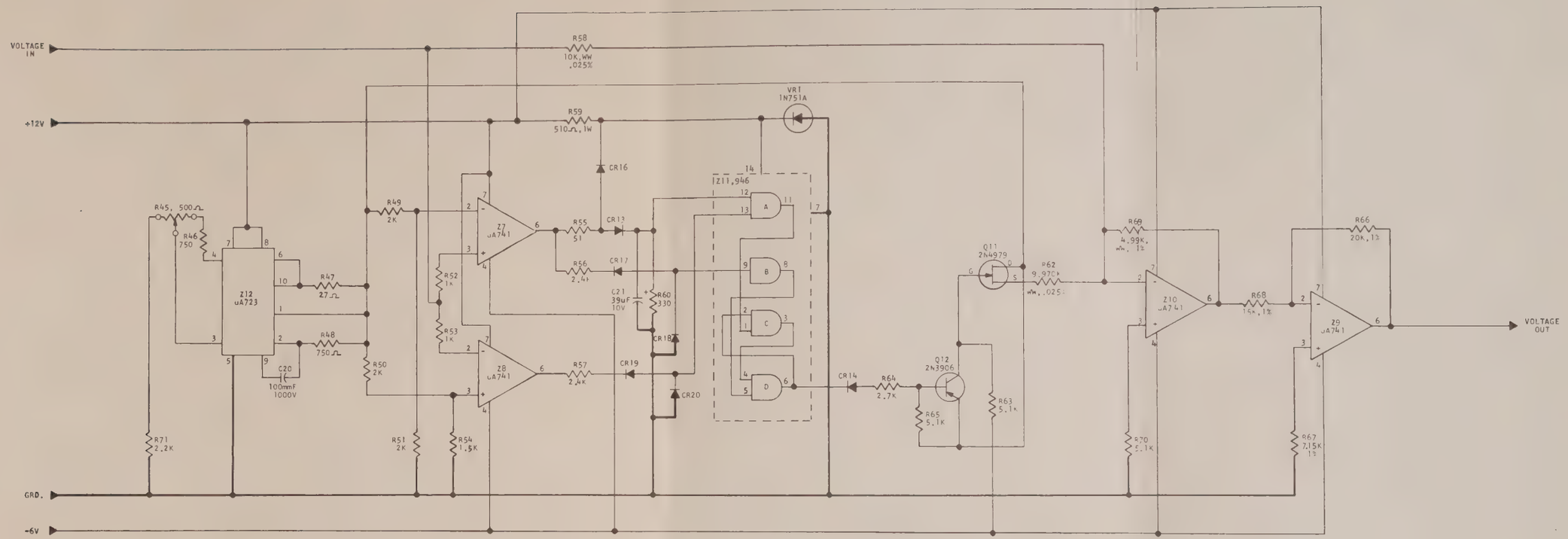


Figure 3. Wiring Diagram, 1567B-1
W/S, W/D translator



NOTES:
1. ----------
2. JUMPER WIRE USED ON -01 VERSION ONLY.
3. PHANTOM AREA USED ON -02 VERSION ONLY. SEE SHEET 2 FOR SCHEMATIC.
4. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED.
5. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES IN OHMS.

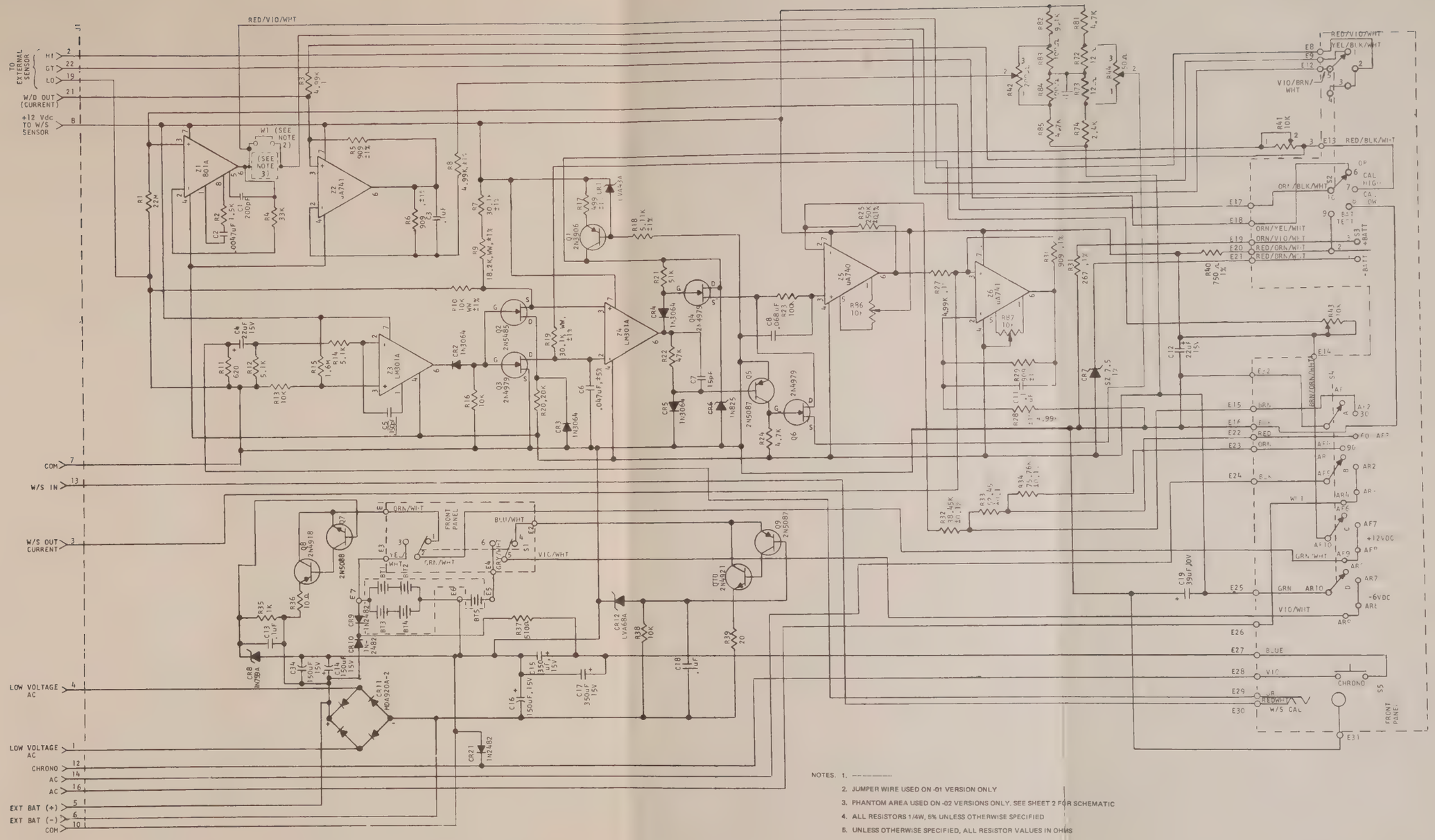
Figure 4. Schematic 1567B-1 W/S, W/D translator (sheet 1 of 2)



NOTES: 1. ----------

2. ALL DIODES 1N3064 UNLESS OTHERWISE SPECIFIED

Figure 4. Schematic 1567B-1 W/S, W/D translator (sheet 2 of 2)



NOTES. 1. ————

2. JUMPER WIRE USED ON -01 VERSION ONLY
3. PHANTOM AREA USED ON -02 VERSIONS ONLY. SEE SHEET 2 FOR SCHEMATIC
4. ALL RESISTORS 1/4W, 5% UNLESS OTHERWISE SPECIFIED
5. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES IN OHMS

Figure 5. Schematic 1567B-1, W/S, W/D translator (for Serial No.'s 1001 through 1024)

APPENDIX A

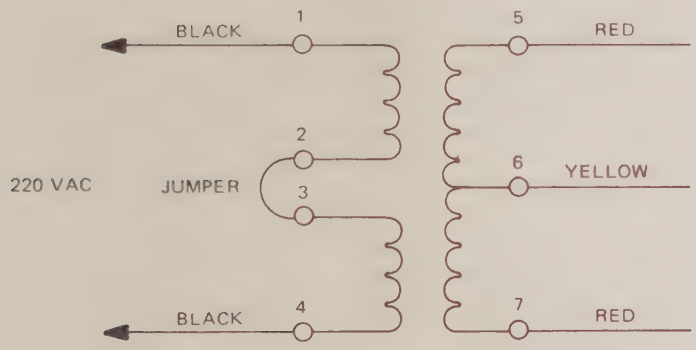
INPUT AC POWER WIRING

APPENDIX A

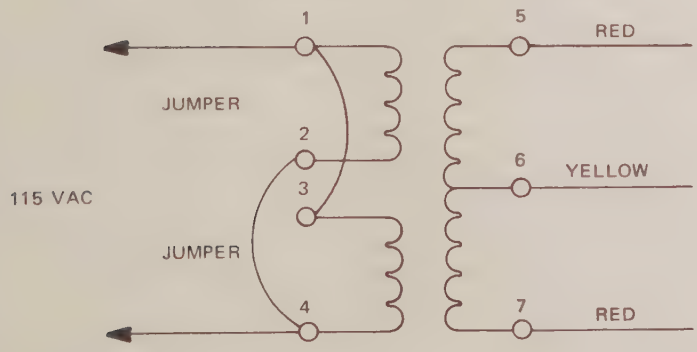
INPUT AC POWER WIRING

Unless specifically tagged otherwise, 1567B and 1567B-1 translators are wired for 115 Vac, 50/60 hertz operation. The power transformer used in the translator is a dual voltage unit. It may be rewired in the field for the appropriate power by changing jumpers as shown below:

(a) 220 ~~115~~ Vac, 50/60 Hz wiring



(b) 115 ~~220~~ Vac, 50/60 Hz wiring



WARRANTY

Teledyne Geotech instrumentation is warranted to be free from defects in materials and workmanship for a period of one year unless otherwise defined in the applicable product data sheet.

Liability under this warranty shall be to the original purchaser only and shall be fully discharged by the repair at Geotech or other repair facility designated by Geotech, or by replacement of any part or parts which prove to be defective within the warranty period. Any transportation charges shall be borne by the purchaser.

This warranty applies only to equipment manufactured by Geotech which has been properly installed and operated and not subjected to misuse, misapplication or abuse.

Expendable and consumable items such as stylii, recording paper, magnetic tape, drive belts, cups and vanes, etc. are excluded from this warranty.

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